

## *Do Migrants' Remittances Decline over Time? Evidence from Tongans and Western Samoans in Australia*

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The main focus of this paper is on the determinants of migrants' remittances, based on a study of Pacific Island migrants in Australia. Of growing concern among policymakers in remittance- and foreign aid-dependent Pacific Island states is the longer term sustainability of external resource flows. Two island states for which private remittance flows constitute a major source of income and foreign exchange are Tonga and Western Sāmoa, the subjects of this study. In both instances migrants' remittances have been the subject of extensive discussion on sustainable development in the Pacific Islands (Ahlburg 1991; Appleyard and Stahl 1995; Bertram and Watters 1985; Connell and Brown 1995; Hayes 1991).

There is current concern that remittances are declining due to lower migration rates, recession, and a decrease in migrants' willingness to remit (Ahlburg 1991; Connell 1990; Miles and others 1992, 66; Marcus 1993, 29; James 1991; Campbell 1992). The rate of growth of migration to major destinations—New Zealand, Australia, and the United States—has declined in recent years due to economic recession and tighter immigration controls in the host countries. Return migration has sometimes been considerable. There is also the prospect that levels of foreign aid from major donors in the Organisation for Economic Cooperation and Development (OECD) will be severely reduced. Although reliance on remittances is growing, remittance decay is expected (Forsyth 1992; Macpherson 1992).

An important issue in this situation is whether per capita remittance levels will decline as the migrants' length of absence increases and ties to

their countries of origin weaken. It has been suggested that even with continued migration the anticipated decline in remittance rates is likely to occur due to family reunification and greater integration of the migrants in the host communities. This process, it is believed, reduces migrants' ability and willingness to remit. Since migration by Pacific Islanders is generally long term, it would follow that the aggregate level of remittances will also decline over time, unless the rate of new migration is sufficient to offset declining average remittance levels among the stock of "older" migrants.

An attempt to substantiate the remittance-decay hypothesis empirically can be found in a study specially commissioned by the Forum Secretariat<sup>1</sup> that concluded that projected remittance levels over the next decade would be inadequate to maintain living standards in a number of Pacific Island countries, including Tonga and Western Sāmoa (Forsyth 1992). The study relied on secondary data for recorded balance-of-payments estimates of remittances and on crude estimates of migrant numbers in the principal host countries. Over the past decade there have been real declines in disposable income growth in host countries, particularly New Zealand. John Foster argued that once such movements have been taken into account, there is little sign of remittance decay, even at the overall level (1995; see also Brown and Foster 1995). What appears to be remittance decay could be explained by changes in migrants' disposable income.

Prior to my Sydney survey with Adrian Walker (Brown and Walker 1995), the remittance-decay hypothesis had not been subjected to rigorous empirical investigation. In this paper I report the main empirical findings from this survey of migrants and their remittances, and identify the main determinants of remittances and their potential responsiveness to policy interventions. In the light of the remittance-decay hypothesis, particular attention is given to the significance of migrants' length of absence (see also Brown 1997). Primary data were collected from a large sample of Tongan and Western Samoan migrants in Sydney at the end of 1994, from which estimates of remittance levels and their composition were made (Brown and Walker 1995). In this paper remittance decay is examined empirically at two levels. First, time profiles of average remittance levels and propensities to remit were constructed from estimates for different cohorts of migrants, based on the number of years since first migrating. These descriptive statistics are presented in tabular and graphic form. Second, using appropriate econometric techniques, for each migrant community a

remittance function was estimated that attempts to separate the effect of time from all other influences on remittance behavior.

In the next section I briefly discuss migration and remittances in Tonga and Western Sāmoa, and expectations from the literature regarding the determinants of remittance behavior. The sample survey and estimated remittance levels are discussed in the third section, and in the fourth section I describe the Tobit regression model used to estimate the remittance functions and report the results for the two migrant groups. Conclusions are offered in the last section.

## MIGRATION AND REMITTANCES IN TONGA AND WESTERN Sāmoa

### *The Economic Significance of Remittances*

Throughout the Pacific Islands region limited economic growth of domestic economies has led to a steady and domestically unimpeded emigration. In Tonga and Western Sāmoa this has led to the size of the domestic population remaining relatively unchanged for much more than a decade, despite relatively high rates of natural increase. Closely associated with the increased emigration has been a growing dependence of those remaining on the return flows of remittances. Recent trends in Tongan and Western Samoan migration and the growing importance of remittances in the migrant-sending economies have been well documented (Ahlburg 1991; Bertram 1986; Bertram and Watters 1985; Connell 1983; Campbell 1992). Remittances have raised living standards, contributed to employment (especially in the service and construction sectors), and eased balance-of-payments problems.

Paul Shankman observed as early as 1974 that remittances by Western Samoan migrants represented over 50 percent of the national income (1976). The situation was broadly similar in Tonga (Connell 1983), although documentation of these early trends was less adequate (see Campbell 1992). Since the early 1970s, remittances have remained at similarly high levels. Between 1980 and 1985, remittances to Tonga were twice as high as they had been in the previous five years (Connell 1983, 49–50; Campbell 1992, 71). In 1984 a national income and expenditure survey in Tonga revealed that 90 percent of households were remittance recipients and that remittances constituted an average of 28 percent of household income (Ahlburg 1991). By the mid-to-late 1980s they represented almost 30 percent of Western Samoan and 40 percent of Tongan gross domestic

product (GDP). Balance-of-payments data (table 1) show that in both economies net private transfers, consisting mainly of remittances, are as important a source of foreign exchange as gross earnings from the export of goods and services. However, official estimates, based on recorded migrants' transfers, grossly underestimate the true magnitude of these flows. It has been estimated that in Tonga and Western Sāmoa, unrecorded migrants' remittances represent anything from 25 to 60 percent of total remittances (Brown 1995a; Brown and Walker 1995). Migrants' remittances are possibly greater than all other sources of foreign exchange combined.

### *Determinants of Remittances*

A belief in remittance decay at the level of the individual migrant is perhaps to be expected. The longer the migrant is away, social ties and distant perceptions of needs and wants are likely to decline. Successful migrants may be followed by others from the same family. Initial savings targets (where they existed) will have been met, and investment in the host, rather than the source, country seems more rational as the probability of return declines. Although migrants face a life cycle of obligations to their home areas, these obligations are likely to lose their immediacy, to compete with new obligations, and to be increasingly ignored. It has also been argued that temporary migrants are able to remit more, partly because many of their expenses are met by permanent migrants, and partly because their temporary visas ensure that their return is imminent. It has been found that migrants permanently overseas were under less pressure to remit as their village commitments became less intense and less significant (Shankman 1976, 59–60) and they had also acquired financial commitments in their host country. On the other hand, it has been suggested that the peculiarities of the “complex inter-relationships and social obligation patterns of the islanders” could imply a continuation of remittances by permanent migrants over the longer term, although at possibly lower levels (Australia 1989).

However, advocates of the remittance-decay hypothesis in the Pacific Islands have drawn support for their arguments mainly from studies of migrants in other countries.<sup>2</sup> David Forsyth's study for the Forum Secretariat postulated a remittance-decay function for the Pacific Islands based largely on evidence from an OECD study of remittance behavior in Europe (Forsyth 1992; OECD 1987). The longer the duration of the migrants' stay abroad, and the greater the associated decline in the number of depen-

Table 1. Major Sources of Foreign Exchange for Tonga and Western Sāmoa

	1990		1991		1992		1993	
	us\$ million	Percent of GDP	us\$ million	Percent of GDP	us\$ million	Percent of GDP	us\$ million	Percent of GDP
<i>Tonga</i>								
Gross domestic product	123.8		149.1		147.1		145.2	
Exports	29.9	24.2	26.1	17.5	21.5	14.6	23.1	15.9
Imports	57.9	46.8	55.5	37.2	54.6	37.1	56.2	38.7
Net private transfers	30.6	24.7	30.2	20.3	28.0	19.0	34.9	24.1
Net official transfers	10.5	8.5	7.1	4.7	9.6	6.6	6.9	4.7
<i>Western Sāmoa</i>								
Gross domestic product	145.5		145.0		148.8		—	
Exports	19.2	13.2	15.4	10.6	17.2	11.6	—	
Imports	37.4	25.7	43.8	30.2	53.5	36.1	—	
Net private transfers	39.7	27.3	31.0	21.4	34.8	23.4	—	
Net official transfers	12.7	8.7	10.6	7.3	—		—	

Sources: International Monetary Fund (1994, 1995); *Pacific Economic Bulletin* (1995).

dents at "home," the weaker the migrants' motivations to remit were assumed to become. This, it was conjectured, explained the "remittance decay function." According to Forsyth, "sustained high rates of remittance tend to be characteristic of migrants who intend staying in the host [country] for a relatively brief period and then returning home. . . . But such rates are unlikely to be sustained if the period of residence is extended [which] suggests a profile over time . . . with remittances reaching a peak soon after arrival in the host country then gradually declining" (1992, 39). Alternatively, other studies have found little evidence of remittance decay. Guy Standing cited three studies of Indian migrants that revealed that the level of their remittances did not decline with time, but rather plateaued at some positive, constant level (1984).

Until recently there have been only limited data on which to conduct further investigation, beyond simple extrapolations based on unreliable, secondary time series data and other evidence often of a more anecdotal nature. It is surprising how relatively little is known about the Pacific Island migrant communities in Australia and elsewhere, including their demography, education and occupation levels, socioeconomic status, and information pertaining to their remittance behavior and associated factors. Because remittances can take many forms, including informal transfers in cash or in kind, and can pass through many different channels and networks, there are clear obstacles to making definitive assessments of remittance behavior. This is not to deny the importance of other work that has been attempted in recent years. Unfortunately, the available data remain fragmentary and often inadequate for statistical analysis. Most of the existing studies were undertaken using rather small sample surveys among pockets of Pacific Island migrants, where the sample size was constrained by limited budgets available to the researchers, who were most often students. As a consequence, previous studies of this sort have failed to produce data sets sufficiently large for purposes of rigorous statistical analysis. Mele Vete found that for Tongans in New Zealand there was a correlation between the number of dependents in Tonga and the amount of remittances (1995). Broadly the same pattern was found by Taiaamoni Tongamoia among Tongans in Sydney (1987). The level of remittances increased during the first few years of migration, up to around seven years, then began to decline, although migrants who had been in Australia for more than eighteen years still sent remittances (Tongamoia 1987, 101-105). On the other hand, Terry Loomis found little evidence of re-

mittance decay among Cook Islanders in New Zealand (1990, 67). All of these studies were based on small samples that cannot be considered statistically reliable and relied on cross-tabulations that cannot isolate the effects of other variables from the effect of the migrant's duration of absence.<sup>3</sup>

What other characteristics can be expected to affect a migrant's remittance behavior? Unfortunately, as Robert Lucas and Oded Stark noted, "there is surprisingly little statistical evidence on the motives for remitting, and the few studies that have appeared are not couched in terms of testable hypotheses derived from a theoretical framework" (1985, 902). It is therefore necessary to rely on the limited amount of empirical and theoretical work available to identify possible variables for inclusion in a more formal, multivariate regression model.

Two closely related motivational characteristics that stand out in other studies of Pacific Island migrants are the strength of the migrant's ties to the home versus host community, and the migrant's intention to return. Variables related to these characteristics, and found to be significant by other studies, include whether permanent residence had been gained (which, it could be argued, influences the probability of return migration); and whether former dependents had joined the migrants living overseas (Tongamoa 1987). Walker and I found that the presence of a surviving parent or spouse in the home country increased the migrant's propensity to remit, while the larger the number of dependents of the migrant living in Australia, the less likely the migrant was to be remitting (Walker and Brown 1995). Where both determining factors had occurred, remittances were virtually nonexistent (Vete 1995). Generally, as in the case of Fijians in Sydney, the volume and regularity of remittances was found to be a positive function of intent to return (Stanwix and Connell 1995). This has been well documented in the case of Tongans and Cook Islanders overseas (Loomis 1990).

As family ties have been found to be important determinants of remittances, it is commonly believed that migrants are unlikely to remit for purposes other than altruistic support of family consumption. However, some authors have suggested that migrants' remittances are motivated as well by other factors that could offset any weakening of the altruistic motive. Stark (1991a, 1991b) and Lucas and Stark (1985), for instance, argued that the migration decision is best understood as part of the family's risk reduction or "family co-insurance arrangement," which they

likened to the portfolio-investment strategy of a firm and in which there is an intertemporal contractual agreement between the migrant and "home" (see also Hayes 1991; Hoddinott 1992). Following two earlier studies (Johnson and Whitelaw 1974; Rempel and Lobdell 1978), Lucas and Stark argued that remittances are often a repayment of the expenditure by family in the migrant's education and are thus directly related to the migrant's educational level. The household may even consciously persuade and sponsor various members to migrate, as an insurance against times of hardship and in anticipation of eventual repayment. Bernard Poirine has taken this argument a step further, arguing that remittances often constitute part of an informal loan agreement between the migrant and nonmigrant family members through which the investment in the migrant's human capital is financed (the loan) and later repaid by the working migrant (the remittances) (1995). After the loan is repaid the migrant sometimes becomes a source of loan finance for investment in the education of the next generation of nonmigrants, implying no tendency for remittances to decay.

It has also been found that self-interest can play a part in the migrants' decision-making framework, either in terms of inheritance-seeking behavior or as rational investors. From studies of migrants in Botswana, India, and the Philippines, Stark found evidence of remittances that were motivated by "tempered altruism or enlightened self-interest" (1991a, 1991b). He suggested that "considerations such as an aspiration to inherit, maintenance of rural investments, and the intention to return mean that the migrant retains a vested interest in his original home beyond altruism" (1991b, 40). An inheritance seeker will continue to remit in order to stay in favor with family. In his study in Kenya, John Hoddinott found that if the migrant was a son there was a positive relationship between the parent's owning land and the amount of remittances sent (1992). If there was more than one son the effects were more evident.

The migration decision is also sometimes motivated by "target saving," implying that such migrants will retain much of their savings with them in the host country, only remitting their accumulated savings on, or over a period shortly before, their final return (Piore 1979; Quibria and Thant 1988).<sup>4</sup> In such cases one could anticipate a remittance profile that is positively sloped over the latter part of the migrant's stay. Rashid Amjad suggested that this factor may explain why, in the case of Pakistan, remittance levels did not decline as the remittance-decay hypothesis would



suggest (1986). Especially where a migrant is intending to return home to retire, remittances of accumulated savings would not necessarily take the form of one lump-sum transfer at the end of the migrant's period of absence, but would still be concentrated over a number of years prior to the migrant's retirement. Stark (1991a) and Cluny Macpherson (1994, 108–113) suggested that, in this case, migrants would transfer savings into long-term assets such as land, housing, or livestock, and possibly other community or “social” assets with a view to enhancing their personal prestige or political influence in the home community. Remittance behavior that is motivated by this form of investment may continue independently of altruistic support of family consumption.

In other situations, migrants sometimes evolve into small entrepreneurs. Studies from the Caribbean countries reported in Sergio Diaz-Briquets and Sidney Weintraub's volume found strong links between remittances and small business development in the remittance-receiving economies, also indicative of at least some investment-motivated behavior (1991). Reporting on the uses of remittances in a Punjabi village, Arthur Helweg described an evolution of remittance use beyond altruistic family support to what he termed the “business investment stage” (1983, 440–41). For the Pacific Islands, Walker and I found evidence of migrants motivated to remit for reasons of saving and investment (Brown and Walker 1995). Remittances in kind and the practice of selling remitted goods as part of an informal international business operation have been found to be an important but much-neglected aspect of remittances by Tongan migrants (Brown and Connell 1993). Such behavior has been described as a “transnational corporation of kin,” seeking to maximize extended household incomes across different continents (Marcus 1981; Bertram 1986).

In another study, Foster, using an econometric analysis of secondary data on savings and real interest rate differentials, found that Tongan and Western Samoan migrants' remittances were responsive to financial incentives in the remittance-receiving countries (1995). This suggests that remittances serve as a source of loanable funds and are potentially responsive to changes in interest-rate differentials.

Irrespective of what motivates remittances, the migrant's remittance level and propensity to remit can be expected to be influenced by the capacity of the migrant to save. This depends largely on the migrant's income and net wealth situation, taking into account the number of

dependents in the migrant household. In the empirical sections that follow, I attempt to analyze Tongan and Western Samoan migrants' remittances in terms of a number of characteristics identified here as most likely to affect their motivation and capacity to remit.

### *Conceptualizing Remittance Decay*

Some analysts have been tempted to draw conclusions about the individual behavioral or motivational characteristics of migrants from studies that focus on aggregate remittance levels where these are affected by a combination of other compositional factors (Swamy 1981; Quibria 1986).<sup>5</sup> Inferences from aggregate, secondary data analysis concerning migrants' motivations for remitting are, at the least, highly dubious. The time profile of aggregate remittances need not bear any relation to the profile of a typical individual migrant's remittance function.

To illustrate this, let it be assumed that there are two subgroups in the migrant community, *A* and *B*. Within each group, members share identical characteristics, with one exception: their length of absence varies. Between the two groups, characteristics differ in such a way that individuals from any given cohort in group *A* remit less than individuals from the same cohort in group *B*. In both groups, however, the longer the migrant has been away, the lower is the level of remittances, other things being equal. In other words, remittance decay is hypothesized for all individuals in each group (see appendix A). What determines the aggregate level of remittances, and how will this change over time?

The average level of remittances for the community (group *A* plus group *B*), at any given point in time, will depend on how the total community is distributed between the two groups, and the average length of absence (or age of cohort) for each group. The larger the proportion of migrants in group *B*, the higher the average remittance level will be, and the "older" the average cohort for a group, the lower the group's average level of remittances will be. Provided the size and composition of the two groups do not change, as each year passes the aggregate level of remittances must fall, given the downward slope of each group's remittance functions, assuming also that there are no new entrants or departures from the group. In other words, as each year passes, the average age of cohort for each group increases and the average level of remittances for both groups falls. Remittance decay occurs at both the individual and the aggregate levels.

What happens when some migrants leave the community (perhaps they return home or die), other new cohorts join the community, or, the characteristics of some existing cohorts change (perhaps they marry, a parent dies or is united with them, or their occupational status or income level changes)? The aggregate level of remittances could move in any direction. If the total size of the community remains unchanged, but its composition changes in such a way that there is now a larger proportion of migrants in group *B* than before, the decay effect due to the passage of time could be more than offset by a positive composition effect. The opposite scenario is also worth considering. If each group's remittance function were upward sloping, but the composition shifted in favor of those with lower remittance levels, the aggregate level of remittances could fall over time. In other words, a *negative* composition effect could more than offset a *positive* time effect, resulting in no decay at the aggregate level despite remittance decay at the individual level.

Finally, if the rate of net migration is positive, an increase in the total number of remitting migrants could offset any decline caused by a negative composition or time effect, and vice versa.<sup>6</sup>

The aggregate level of remittances, and changes in this level over time, can therefore be interpreted as the product of these three effects: the *time effect*, the *composition effect*, and the *size effect*. Nothing can be inferred about the remittance behavior of the individual migrant from observations of aggregate remittances over time. Nor can anything be concluded about movements in aggregate levels of remittances exclusively from knowledge of individual remittance behavior. To explain and predict changes in aggregate remittance levels, and to identify policy measures to influence the level of remittances over time, it is necessary to separate out the three different effects.

In the Pacific Islands migration literature, concern about remittance decay appears to stem from beliefs about trends in and interactions between two of these variables, namely, the *size* and the *time* effects. First, there is valid concern that with a combination of tighter immigration controls in the traditional destination countries and increasing migration flows from other Asia-Pacific countries, migration and employment opportunities for Pacific Islanders are declining. Second, there is a belief, not substantiated by any empirical evidence, that the longer migrants stay away from their home countries the weaker their ties and remittance propensities become, resulting in a negative time effect. If both suppositions

are correct, there is every likelihood that the aggregate level of remittances will begin to decline, unless other structural changes result in an offsetting, positive composition effect.

On the other hand, a decline in the rate of new migration would only result in a negative size effect if migration rates were to fall so low that the total stock of migrants began to decline. If there is no evidence of a negative time effect, a negative net migration rate would be required to bring about a fall in aggregate remittances, unless other composition effects were also negative.

The purpose of this study is twofold: to identify and quantify the main compositional variables that influence, positively and negatively, a migrant community's remittance levels; and, once the effects of the significant compositional characteristics have been isolated, to determine how a migrant's remittance behavior is affected by the passage of time.

### *Policy Significance*

Future trends in remittance levels, as well as their uses, are of great significance from an economic policy perspective for both the source and the host countries. There is little doubt that policymakers in the migrant-sending countries need to ensure the best possible use of both remitted funds and domestic savings to safeguard the economic sustainability of Pacific Island populations in the future (see Brown, Foster, and Connell 1995; Brown and Foster 1994, 1995). It has been increasingly apparent in Pacific Island countries, and in international organizations serving those countries, that there has been inadequate information on remittances and their use, and hence on their real and potential contribution to economic development. If individual remittance rates are found to decay rapidly over the earlier years of migration, then aggregate remittance levels can be expected to respond almost immediately to changes in the average length of absence of the migrant community. Also, if the average length of absence of the migrant community does affect remittance levels significantly, it becomes necessary for the *rate* of new migration to be maintained if a decay in remittance levels is to be prevented. On the other hand, if migrants continue remitting on a regular basis throughout their lives, total remittance levels will not decline provided the rate of new migration is at least sufficient to offset the decrease in the total migrant numbers arising from death or return migration; that is, provided the total "stock" of migrants does not decrease.

If remittances are motivated mainly for the support of family consumption, as suggested by the remittance-decay hypothesis, it can be expected that they will lead directly to increased imports of consumption goods with little impact on the generation of productive investments at home. If, however, remittances are found to be determined, at least in part, by the migrants' choice of saving and investment portfolio, they become potentially responsive to policy intervention by governments eager to attract higher levels of remittances and to channel them into domestic investment.

The dependence of the Tongan and Western Samoan economies on migration and remittances is well recognized by their governments, which have urged governments of host countries to liberalize their immigration policies to facilitate emigration (Appleyard and Stahl 1995; Australia 1989; Cuthbertson and Cole 1995). Indeed, it has been suggested that in the context of reduced foreign aid allocations to Pacific Island states, more liberal immigration policies could be used to support their economies. Two issues arise here. First, the extent to which remittances are found to decline with the migrant's length of absence from home will determine the extent to which immigration policies in the host countries would need to be directed toward increasing the intake of new migrants to compensate for remittance decay and reductions in foreign aid to the source countries. Second, the extent to which remittances are found to be potentially responsive to variables other than the needs of the dependents in the source country will determine the scope that exists for policy intervention by host governments. For instance, they could consider introducing supply-side policies to encourage higher levels of remittances and the channeling of these into savings funds or investment projects in the source countries. The use of selective immigration policy as a complement to foreign aid is a contentious issue. Sandy Cuthbertson and Rodney Cole argued that there is little evidence that the safety valve of international migration enabled sending countries to gain significantly from a reduction in domestic population or to benefit from the receipt of remittances to restructure their economies (1995). In the Australian context they argued against introducing policies to grant Pacific Islanders easier entry as migrants, on the grounds that this would discourage domestic economic development in their home countries. For Cuthbertson and Cole, migration and remittances have become substitutes for domestic development (1995). However, they provide no empirical evidence to support their assertions.

## SURVEY ESTIMATES OF REMITTANCES

### *The Sample Survey*

From late September to early December 1994, a total of 982 households from the Tongan and Western Samoan communities in Sydney were surveyed. This sample represents about 22 percent of the total Tongan-born population in Australia and approximately 15 percent of the Western Samoan-born population as estimated by the 1991 Australian census.<sup>7</sup> The precise population size of the Tongan and Western Samoan migrant community in Sydney is unknown. The 1991 census data were used as a proxy for the population of the Tongan and Western Samoan migrant communities in each of the forty-one Statistical Local Authorities (ABS 1991).

The targeted migrant communities or populations consist of all households where at least one member of the household was born in either Tonga or Western Sāmoa. The “key informant” sampling methodology was adopted (see Bilsborrow, Oberai, and Standing 1984). Consequently, the sampled migrant households could not be selected on a purely random basis, and neither the probability of the sampling error nor reliable confidence intervals could be calculated. To ensure that the survey obtained a representative proportion of socioeconomic migrants, the forty-one Statistical Local Authorities were classified into four socioeconomic strata. The distribution of migrant households across the authorities was assumed to reflect the composition of the migrant population in terms of the relative socioeconomic situation of its members.

Before the interviewing began, church and other community representatives were approached and the purpose of the exercise explained and discussed. This ensured the cooperation of the interviewees as well as the identification, location, and interviewing of the households that make up the population. It is believed that any biases resulting are largely offset by the size of the sample, which amounted to approximately one-third of the total Sydney population of Tongan and Western Samoan migrants.

The survey was conducted by interviewers from the migrant communities themselves. To minimize sample bias, a number of other procedures were followed. With the Western Samoan community, a quota system was used to ensure that the numbers of respondents were apportioned across the different church congregations in accordance with their estimated relative sizes, thereby establishing a representative balance among all of the

churches. With the Tongan community, where the chosen interviewers were community leaders who had access to confidential community lists from other sources, it was considered unnecessary to follow the same church-based quota system.

The available budget for the survey limited the target sample to 1,000 households. The target number of households to be surveyed was set at 600 from the Tongan community and 400 from the Western Samoan community, reflecting the relative size of their populations in the 1991 Australian census. When selecting households for inclusion in the sample, the interviewers were unable to preselect on the basis of the respondents' socioeconomic situation. Interviewers were therefore assigned a quota of households to survey from each of the four strata, on the assumption that this would ensure a representative cross-section of income levels in the overall sample. Interviewers were instructed to apportion their samples across the forty-one Statistical Local Authorities on the basis of the proportions of migrants in each of the strata. As the final sampling was based largely on migrant households that were associated with the various ethnic community groups, churches, and other organizations, it is conceivable that households from these higher socioeconomic strata do not participate as actively in the community organizations. It is therefore possible that the Western Samoan sample is slightly biased toward households in the lower socioeconomic groups and with stronger ties to the Western Samoan ethnic community.

### *Estimating Remittance Levels*

Remittances can take different forms, some of which are not accounted for in the official balance-of-payments remittance estimates in either the sending or the receiving country. Remittances are defined here as inclusive of the following forms of international resource transfer by the migrant household to households or other parties overseas: money transfers sent via the formal banking system to households; money transferred informally in cash (bills) or via an informal agent to households; the value (in Australia) of all goods sent to households; payments made by the migrant on behalf of households; donations by the migrant to other institutions or organizations; and deposits made into bank accounts held by the migrant overseas.

The official balance-of-payments estimates refer almost exclusively to the first and last categories (and possibly the fifth), although in Western

Sāmoa a proportion of cash foreign exchange deposits is assigned to remittances. In Tonga these are treated as revenues from tourism. In either case they eventually end up in the banking system as current account receipts, unless they are subsequently used to settle foreign exchange transactions (or simply deposited in offshore bank accounts) through informal channels.

Migrant transfers in kind, mainly in the form of goods, are sent mostly to households as “gifts” or “personal effects,” and are often not recorded as imports and escape any duties. A significant amount of these end up in informal sector flea markets (Brown and Connell 1993). Most of these transfers would therefore be unrecorded, either as remittances or as imports, in the balance-of-payments statistics.

It has also been found that migrants remit to other institutions and organizations, mainly churches (see Brown 1994, 1995b; Brown and Walker 1995). Donations are often collected by the churches in the host countries and held in bank accounts there, to be transferred overseas or used to settle international payments on behalf of the church in the country of origin. If these transactions show up at all in the balance-of-payments records, they do not appear as migrants’ remittances.

Migrants sometimes also make payments on behalf of relatives or others in their country of origin. These consist of payments for services such as insurance premiums paid to Australian- or New Zealand-based companies, schooling and other educational expenses, or, most commonly, payments for international airfares made directly to the airlines. In most instances the airfare enables the relative to visit the migrants in their host countries. This usually also implies that all other travel costs and living expenses are borne by the migrant. These too should be treated as effective “remittances” to the country of origin, as they amount to foreign exchange transfers from the migrants to overseas residents for the purpose of international travel. Such payments would appear neither as current account receipts nor as payments for overseas travel.

Finally, it has been found that migrants also transfer money to their country of origin for the purpose of acquiring assets there on their own behalf (Brown 1995a; Walker and Brown 1995). These assets could be financial savings deposits with banks, or other physical assets such as land, housing, farm equipment and supplies, inventories for small businesses, and so on. Such transfers can be made directly through the formal network, but are often undertaken indirectly via a third party or agent on an informal basis.



Table 2. Composition of Remittances

	Tonga		Western Sāmoa	
	Sample average	Remitters' average	Sample average	Remitters' average
<i>To Households</i>				
Money transferred	900	1,003	1,120	1,487
Cash carried	1,100	1,227	15	20
Goods (value)	768	856	685	910
Payments on behalf of household	184	205	514	683
<i>To Others</i>				
Donations	210	234	93	124
Savings	—	—	37	49
TOTAL	3,162	3,525	2,464	3,273

*Note:* All figures in Australian dollars.

*Source:* Brown and Walker (1995).

In this section remittance levels are reported using two different bases, a “sample average” and a “remitters’ average.” The sample average refers to the average for the entire sample, including those who did not remit at all during the previous financial year.<sup>8</sup> The “remitters’ average” is based on the total number of respondents who sent remittances in at least one of the forms identified earlier. That is, it does not include those who did not remit in any form. Table 2 shows the two averages for each form of remittance for both migrant groups.

Two important findings emerge from these data. First, it is evident for both migrant groups that money transferred to households through the formal banking system represents only part of total remittances. For the average Tongan household, A\$900 out of a total of A\$2,952 was sent to household members (approximately 30 percent), and for Western Samoans, A\$1,120 out of a total of A\$2,334 (50 percent).<sup>9</sup> For Western Samoans, these formal bank (or post office) transfers were the largest single component, while, for Tongans, money sent or carried informally was the largest component (A\$1,100). For both groups remittances in kind were substantial, amounting to A\$768 per Tongan and A\$685 per Western Samoan

household respectively. However, indirect transfers through payments on behalf of households in Western Sāmoa were almost as important as remittances in kind (A\$514 per household).

The implication of this finding is that all other estimates of total remittances to Tonga and Western Sāmoa significantly understate the actual levels, including Forsyth's (1992) estimates for the Forum Secretariat, which appear high on a *per migrant* basis. What do these estimates imply in terms of total remittance levels? In 1992 total recorded remittances to Tonga and Western Sāmoa were US\$27.2 and US\$43.4 million respectively. In both cases remittances represented almost 90 percent of total exports of goods and services, or 20 percent of estimated gross domestic product in the case of Tonga and 30 percent in the case of Western Sāmoa. If the remittance behavior of all Tongan and Western Samoan migrants is similar to that of those living in Sydney, and if it is assumed that all remittances sent to other (nonhousehold) recipients pass through the formal banking system, the 1992 remittance estimates would need to be increased to approximately US\$90 million in both cases. Adjusted remittances would then represent approximately two-thirds of gross domestic product for 1992 in both Tonga and Western Sāmoa, although the estimates of gross domestic product themselves would also need to be revised upward.

The magnitude of the difference between the sample and remitters' averages for the two groups is important. From table 3 it is evident that the average level of remittances *per remitting household* is very similar for the two groups.

The average Western Samoan household (and number of potential income earners) is larger than the average Tongan household. However, the sample average of remittances per household is lower for the Western Samoans, indicating that a smaller proportion of households remit. This is verified by the data in table 3, which indicate that 90 percent of Tongan households and 75 percent of Western Samoan households remitted during the previous twelve months. In relation to total household disposable income, the Tongans remit, on average, a slightly larger proportion of income despite their higher average per capita income levels, or 9.3 percent in comparison with the Western Samoans' 8.0 percent. Conceivably, factors such as the higher incidence of step migration and unemployment among Western Samoan migrants may account for their lower average propensity to remit. These and other possible explanatory variables are tested econometrically in the next section.

Table 3. Sample Average Remittances and Propensities to Remit

Country of birth	Number of households	Remitters' average	Incidence of remitters	Sample average	Average propensity to remit
	Percentage of households			A\$	Percent
Tonga	609	3,525	89.7	3,162	9.3
Western Sāmoa	340	3,273	75.3	2,464	8.0
New Zealand-born Western Samoans	27	1,440	55.6	800	2.9

*Note:* Average propensity to remit = mean remittances/mean income × 100.  
*Source:* Brown and Walker (1995).

Table 3 also provides remittance data for the small subsample of second-generation Western Samoan households. It is remarkable that more than half of these remitted during the previous year, at an average level of A\$1,440 per remitting household. This indicates that earlier estimates by Dennis Ahlburg (1991), which suggested that only 30 percent of higher-order generation Pacific Islanders remit, are perhaps too low. Ahlburg's estimate was based on studies by Loomis (1990) and Richard Bedford (1984), who had used significantly smaller samples.

*Time Profile of Remittances*

In the absence of reliable time-series data for remittances, the survey estimates of average total remittances per household were calculated for six cohorts with a view to constructing a remittance function. These data, summarized in table 4, provide an initial indication of the relationship between the level of household remittances and the length of time the migrant has been away. They suggest that for both migrant groups there is little evidence of remittance decay. The remittance functions, showing the relationship between average levels of remittances and length of absence from country of origin, are shown graphically for the two migrant groups in figure 1.

For both Western Samoan and Tongan migrants, the average level of

Table 4. Total Remittances by Length of Absence from Country of Origin

	Number of households	Remitters' average	Incidence of remitters	Sample average	Average propensity to remit
			Percentage of households		
Absence in years		A\$		A\$	Percent
<i>Tonga</i>					
0–5	19	1,995	78.9	1,574	5.4
5–10	169	3,321	91.0	3,022	5.4
10–15	230	3,647	92.6	3,377	9.9
15–20	109	3,502	87.0	3,047	8.2
20–25	59	4,315	81.0	3,495	8.5
25+	23	3,162	95.7	3,026	7.4
<i>Western Sāmoa</i>					
0–5	17	1,875	94.1	1,764	7.2
5–10	62	2,823	77.0	2,174	7.0
10–15	83	2,918	73.5	2,239	6.9
15–20	75	4,280	74.7	3,197	11.1
20–25	66	3,163	63.1	1,996	6.7
25+	39	3,427	89.7	3,074	8.4

Note: Average propensity to remit = mean remittances/mean income  $\times$  100.

Source: Brown and Walker (1995).

remittances per household increases after five years of absence (see figure 1). For the Tongan group the average level of remittances rises more sharply and then levels out, fluctuating within a reasonably narrow band between A\$3,000 and A\$3,500 per year. For the Western Samoan group there is a more gradual but steady increase in the average remittance level up to the A\$3,000 level, which is then followed by a sharp decline to A\$2,000 when the length of absence exceeds twenty years, and a subsequent recovery to the A\$3,000 level for those who have been away more than twenty-five years. It also is noticeable that the incidence of remitting Western Samoan households is highest among the most recently arrived migrants (94 percent) and decreases quite sharply with the length of their

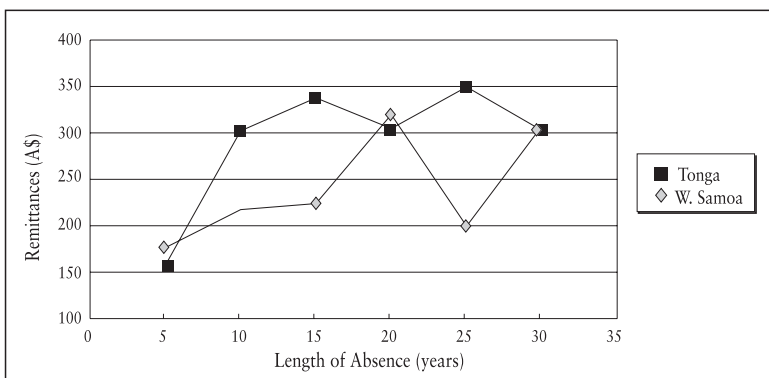


Figure 1a. Absolute Remittance Levels.

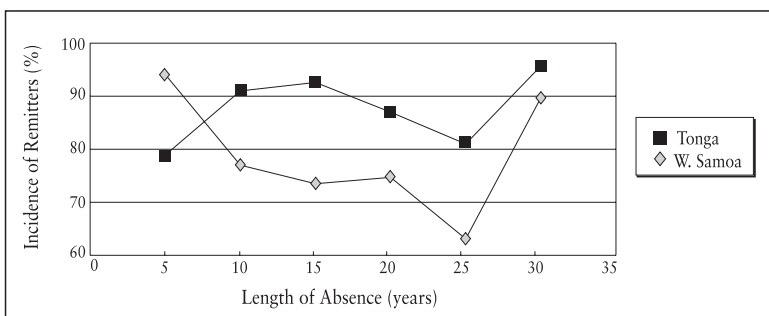


Figure 1b. Incidence of Remitters.

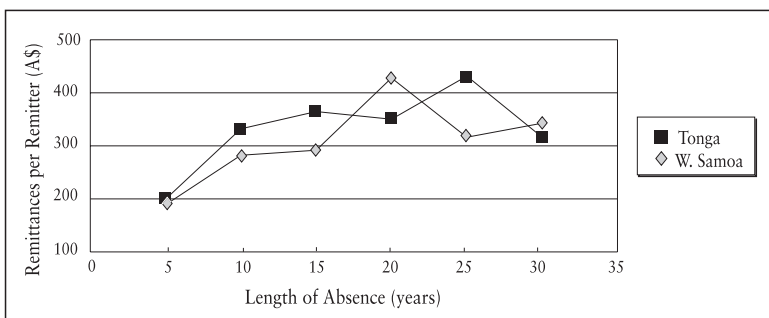


Figure 1c. Remitters' Remittance Levels.

Figure 1. Remittance Time Profiles: Absolute Levels.

absence, to as low as 63 percent for the group who has been away for twenty to twenty-five years (figure 1b).

By contrast, the incidence of Tongan remitters increases (also to over 90 percent) until the length of absence exceeds fifteen years, and never falls below 80 percent. The average level of remittances per remitting household (figure 1c) shows a positive trend for both groups until the length of absence exceeds twenty years for Western Samoans and twenty-five years for Tongans. Thus, only when the length of absence *and* the incidence of remitters decline together, after twenty years of absence, does the Western Samoans' average remittance level show a significant drop. When both the incidence of remitters and the remittance level per remitting household show an increase when the length of absence extends beyond twenty-five years, the remittance function kinks up again.

Another important finding concerns the behavior of those who have been away for more than twenty-five years. In both instances the incidence of remitters rises very sharply (figure 1b) reaching 90 and 95 percent for Western Samoans and Tongans respectively. This finding ought to be investigated further, as it suggests a significant change in the migrants' remittance behavior, reversing the negative trend (with both groups) in the incidence of remitters, and compensating, in the Tongan case, for a decline in the average level of remittances per remitting household. If the factors explaining such shifts can be identified, some useful policy implications could emerge.

The propensity to remit was also calculated, where this is defined as the average level of remittances per sampled household expressed as a percentage of average household income. Again, these were calculated for each of the subgroups as reported in table 4 and shown graphically in figure 2.

The average propensity to remit of the two communities is of a similar magnitude, moving around the 8 percent level (figure 2a). For the Tongans, it increases sharply after five years of absence (to over 10 percent) and thereafter shows a steady decline to 7.4 percent. With the Western Samoan group, however, the average propensity to remit is relatively stable, at around 7–8 percent, with the exception of the subgroup that has been away for fifteen to twenty years. For them the average propensity to remit rises sharply to over 11 percent. The average income level of this subgroup is very low (figure 2c), suggesting that income level is not a significant determinant of remittance level. For the Tongan group on the

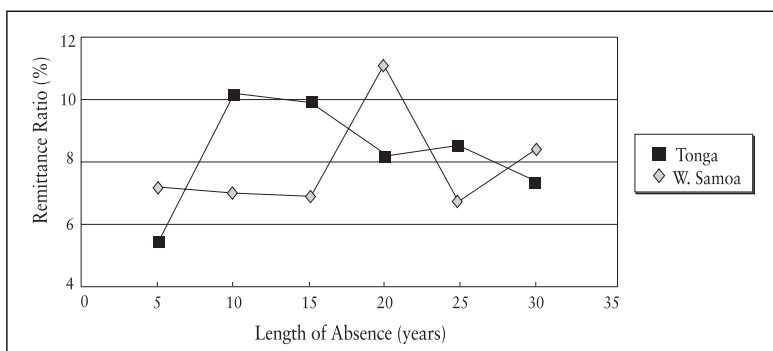


Figure 2a. Average Remittance Propensities.

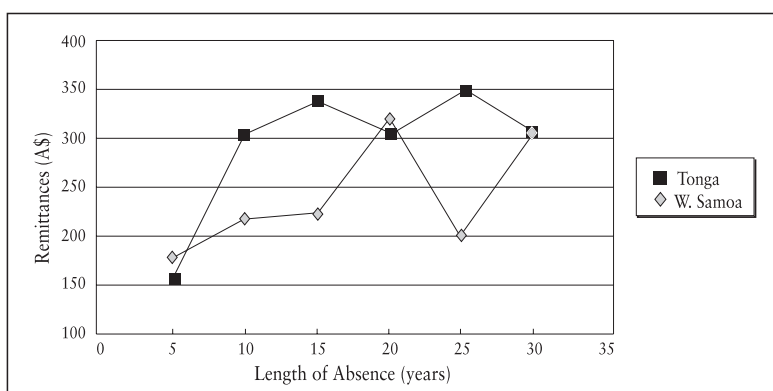


Figure 2b. Absolute Remittance Levels.

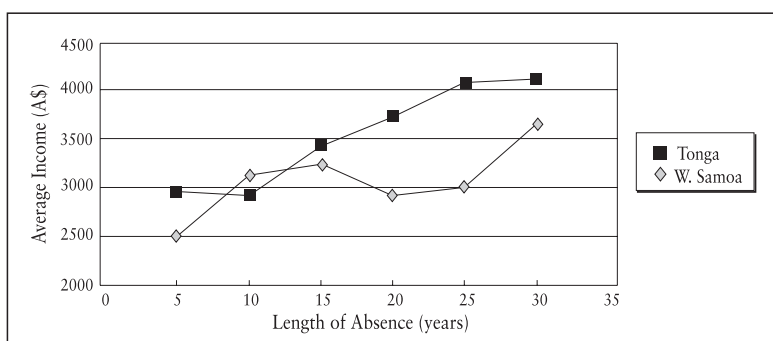


Figure 2c. Average Household Income.

Figure 2. Remittance Time Profiles: Average Propensities.

other hand, these data suggest that as average income levels increase with the migrants' length of absence (figure 2c), the average propensity to remit declines (figure 2a).

Although these data show little evidence of remittance decay, extreme caution must be exercised in drawing conclusions from the preceding descriptive analysis. As argued earlier, it is necessary to isolate three different effects: the *size effect*, the *composition effect*, and the *time effect*. It is possible that the remittance levels of the different time cohorts are influenced by compositional effects. In other words, it cannot be assumed that the compositional structure of each cohort is the same. Differences in average remittance levels between time cohorts cannot necessarily be attributed to differences in the average length of absence between the cohorts. The volatility of the plotted remittance functions in figures 1 and 2 suggests that factors other than length of absence could be important determinants of remittances. To identify the most important compositional characteristics, and then assess the significance of length of absence while controlling for all other potential determinants of remittances, a multivariate regression analysis was undertaken.

#### REGRESSION ANALYSIS OF REMITTANCE DETERMINANTS

The main purpose of the Tobit regression analysis used here is, first, to identify which of the variables are the most significant determinants of remittance behavior, where remittance behavior consists of two elements: whether or not to remit, and, if so, how much to remit; and, second, to measure the effect on remittance levels, in monetary terms, of changes in the most significant migrant characteristics. The dependent variable in the regression model is the value of remittances in Australian dollars in all forms identified previously over the twelve-month period preceding the survey.

From the earlier discussion of remittance decay and the literature on the motivations and determinants of remittances, three broad categories of factors affecting a migrant's remittance behavior can be distinguished, apart from the effect of duration of absence alone.<sup>10</sup> First are factors that influence the strength of the demand-side pressures on a migrant from the receiving end, in particular, family and community ties. Second are the supply-side factors that affect the migrant's capacity to remit, such as income and net wealth. Third are the various behavioral characteristics that influence the migrant's motivations to remit, such as self-interest.



Four demand-side variables are included in the model: whether the head of household and spouse still have at least one living parent in the country of origin (PARENT); whether the head of household is married, with spouse still in the home country (SPOUSE); whether the household had received house-guests to stay during the preceding twelve months, which is an indicator of continued family or community ties (VISITOR); and whether the head of household step-migrated to Australia via a third country (New Zealand), which is a proxy for the migrant's degree of remoteness from the original home community (STEP).

Three supply-side variables are included in the model: household income level, expressed in Australian dollars, after tax, as declared by the head of household for the twelve-month period preceding the survey (INCOME); value of assets held by the household in Australia, less the value of debts, expressed in Australian dollars (ASSETS); the number of persons living in the household (HOUNUM).

Eight behavioral or motivational variables are included in the model: whether the head of household considers that his or her parents are poor, which would, if significant and positive, indicate that the migrant is motivated by altruism (POOR); whether the head of household intended to return to the country of origin, which, if significant and positive, would indicate that those planning to return one day remit more than those who do not (INTENT); whether the head of household is fifty-five years of age or more and intends to return home, which, if significant and positive, would indicate that returning retirees can be expected to remit more than other returnees (SENINT); whether the head of household expected to inherit assets from a parent still living in the country of origin, which would be significant and positive if the migrant were motivated by inheritance-seeking self-interest (INHERIT); whether the head of household owned land in the country of origin, which would be significant and positive if the migrant's remittances were motivated by continued maintenance of land assets at home (LAND); whether the head of household owned assets other than land in the country of origin, which would be significant and positive if the migrant's remittances were motivated by business investment (OWNOVS); the head of household's level of education attained *before* migrating, at four possible levels: elementary schooling, secondary schooling, technical training, and university education, which, if significant and positive, would indicate if Poirine's (1995) human capital version of this hypothesis applies (SECONDARY, TECHNICAL, UNIV), with the omitted control category having elementary education only; and whether

the head of household received financial assistance from relatives at home for migration purposes, which ought to be significant and positive if Stark's (1991a) informal loan hypothesis holds (HELPED).

### *Length of Absence*

The model allows the migrant's length of absence to affect remittance levels in a number of ways, captured by a set of time-interacted variables: the number of months since the migrant first emigrated, which if significant and negative would indicate underlying remittance decay (TIME); and the number of months since the migrant first emigrated squared, which allows for a possible nonlinear (quadratic) decay function (TIME<sup>2</sup>).<sup>11</sup>

### *The Results*

The means and standard deviations are reported for each of these variables, for "All Migrants" and "Remitting Migrants" in appendix table A1. The regression analysis was performed separately for the Tongan and Western Samoan subsamples. Two sets of results are reported for each migrant group in appendix table A2, and the main findings are summarized in table 5, showing which variables are significant at least at the 10 percent level.

The Tobit estimates indicate which variables are significant in determining the desire and ability of migrants to remit. Caution should be exercised in interpreting the values of the estimates. The marginal effects indicate the remittance behavior of the overall sample of migrants, both remitters and nonremitters. In essence, they show how changes in the characteristics of the average migrant affect the average migrant's level of remittances, allowing for the possibility that some migrants in the overall sample do not remit at all. Take, for instance, the variable PARENT. It has a significant effect on the remittance behavior of remitting migrants and the average migrant in both migrant communities. Table 5 shows that in the case of Tongan migrants, the existence of a living parent at home raises a remitting migrant's annual remittances. Thus, if a remitting migrant's parents were to die or become united with the migrant household in the host country, that migrant's remittances could be expected to fall, other things being equal. From the marginal effects for the average migrant (or for one who is drawn randomly from the migrant community), the existence or not of a surviving parent affects remittance levels by A\$602 per year, other things being equal. Similarly, as far as income is

Table 5. Summary Regression Results and Marginal Effects

Variable	Tonga		Western Sāmoa	
	Tobit estimates	Marginal effects	Tobit estimates	Marginal effects
PARENT	2,012.1	602.3	2,187.5	269.3
SPOUSE	2,402.0	719.0	1,323.6	163.0
VISITOR	916.0	—	1,457.6	—
STEP	1,093.6	—	—	—
INCOME*	77.4	23.2	32.9	4.1
ASSETS*	—	—	5.9	0.7
INTENT	—	—	3,403.5	419.0
SENINT	4,459.8	1,335.0	-2,055.5	—
LAND	567.0	—	—	—
HELPED	—	—	821.8	—

*Notes:* Dependent variable = remittances, A\$ per year; — = not statistically significant at 10 percent level; \* per A\$1,000.

concerned, the Tobit estimates show that for remitting migrants an increase in annual income will result in an increase of annual remittances, for both Tongans and Western Samoans. The marginal effects indicate that a A\$1,000 increase in annual income can be expected to result in a A\$23 increase in remittances for Tongans, and a A\$4 increase for Western Samoans.

The list of variables included among the statistically significant ones in table 5 indicates that, for both Tongan and Western Samoan migrants, remittance behavior is affected by a combination of supply-side, demand-side, and motivational variables. On the demand side it is evident that migrant's remittances are positively related to the existence of a surviving parent or spouse in the migrant's home country, and to the variable VISITOR, which is a proxy for the strength of ties to the home community.<sup>12</sup> The results do not support the hypothesis that the strength of ties is weaker (and hence remittances lower) among migrants who have step-migrated to Australia from New Zealand. For the Western Samoan community, a much larger proportion of whom did step-migrate (80 percent) the variable STEP is not significant at all, while for the Tongan community

it has a significant but positive effect on the behavior of remitting migrants, indicating that step migrants have a *higher* propensity to remit than other remitting migrants.

On the supply side, the migrant's level of income is significant for both groups, and the parameter estimates suggest a marginal propensity to remit of approximately seven percent and three percent for Tongan and Western Samoan remitters respectively. This result is important for it indicates that if there is evidence of remittance decay, it could be offset by rising average income levels over time. Two further observations can be made here. First, household size and, therefore, the number of dependents is not a significant factor in either case. This implies that the number of dependents living in the migrant households has no effect on the migrants' remittances to dependents or others in their country of origin. Second, although household income earned during the preceding year is significant for both groups, asset ownership also appears to be an important determinant of Western Samoan remittance behavior. This could explain why Western Samoan remittances are possibly less responsive to income changes. In other words, it is their asset wealth or "permanent income," rather than year-to-year fluctuations in household "transitory income" that determine levels of remittances.<sup>13</sup>

Evidence exists that motivations other than altruism are important determinants of remittance behavior. First, in both communities there is evidence of self-interest as a significant motivational factor. Migrants who intend to return home have a significantly higher propensity to remit and level of remittances than those who do not. This indicates that the prospect of return migration will be associated with a higher-than-otherwise transfer of remittances, which again is supportive of a self-interest motive. However, there is one important difference between the Tongan and the Western Samoan communities. With the Tongan community it is only migrants who are in the fifty-five-years-and-older age group whose remittance behavior is positively related to the intention of returning. A migrant who is over fifty-five and intends to return home can be expected to remit more than others. For the Tongan migrant community as a whole, the marginal effect is A\$1,335 per year. In the Western Samoan community, on the other hand, migrants in that age category remit *less* than others who intend to return. A migrant who intends to return can be expected to remit A\$419 per year more than those who do not.

It could be that Tongan migrants prefer to hold their savings in Austra-

lia, transferring their nest eggs over a short period as they approach retirement. Younger Western Samoans, on the other hand, could prefer to move their savings into assets in their home country as they earn, but, as they approach retirement age, may prefer to accumulate more in Australia. The reasons for these differences are not obvious and require further investigation. They could reflect differing economic conditions and investment opportunities in the two migrant-sending countries, which would be consistent with Foster's finding that remittances are sensitive to real interest rate differentials between the sending and host countries (1995). This would also suggest that remittance behavior would be responsive to changes in economic policy and the personal investment climate in the migrants' home country.

Second, there is evidence that financial obligation, or indebtedness, to the home community is also of importance among Western Samoans. The significance of the variable HELPED indicates that having received financial assistance from relatives at home to migrate positively affects a migrant's subsequent remittance behavior. Migrants who received assistance can be expected to remit more than others. However, it is also apparent that the level of educational attainment before migrating is not associated with differences in the migrants' remittance behavior. In other words, there is no evidence that in situations where parents have invested more in a migrant's education that this will induce a higher than otherwise level of remittances, after taking level of income and other related variables into account.

Third, asset ownership in the migrants' home country does not appear to motivate a higher-than-otherwise level of remittances. However, it is noteworthy that among Tongan migrants there is some evidence that remittance levels are positively related to the ownership of land in Tonga, but this variable is significant only at the 10 percent level.

Finally, the most significant result of the regression analysis is the lack of any evidence of remittance decay for either migrant community. If remittance decay were present, the variable TIME, and those that are interacted with TIME would need to be statistically significant, either individually or collectively, allowing also for nonlinear relationships (TIME<sup>2</sup>). The results show that in the case of the Tongan community, while the sign of TIME is negative, it is not statistically significant, even at the 10 percent level. For the Western Samoan community, it is significant at the 10 percent level, but is *positive* in sign, which indicates that the level of remit-

tances *increases* with the migrants' length of absence, controlling for changes in all other variables.<sup>14</sup> In other words there is no evidence that the remittance functions of migrants are downward sloping as represented by the hypothetical remittance functions presented in figure A1, appendix A.

## CONCLUSIONS

Migration and migrant earnings are vital not only to the livelihoods of the migrants and their accompanying dependents, but also to the nonmigrant relatives and communities remaining in the migrants' country of origin. The survey results show that remittances are of far greater significance than the official balance-of-payments data suggest. The possible decline in remittances as opportunities for immigration and employment decrease in the main OECD host countries is of concern to policymakers in the migrant-sending countries and should be of concern too to policymakers in the host countries, which are also significant aid donors in the region. The unrequited private transfers of migrants need to be considered by host country governments as complementary to official aid flows. The design of policies to increase remittances either by increasing employment opportunities for migrants, or by encouraging them to remit more, should be on policymakers' agendas in both the migrant-sending and the OECD host and donor countries.

Whether or not remittances can be expected to decline, and the design of appropriate government policy to prevent this, depend on a knowledge of what factors most affect migrants' remittance behavior and what motivational characteristics policymakers ought to consider in their choice of policy instruments to stimulate greater remittance flows. Changes in the aggregate level of remittances were identified as the product of three effects: the *size effect*, which is determined by the rate of net migration and natural attrition in the migrant community; the *composition effect*, which is determined by changes in the composition of the community in terms of those (nontemporal) characteristics that most influence their remittance behavior; and the *time effect*, which is the effect that length of absence alone has on remittance behavior.

The results of this study demonstrate that none of the assumptions about migrants' remittance behavior on which the doomsday, remittance-decay scenario is based, is valid. There is also much less cause for pessi-

mism concerning the sustainability of remittance levels. The multivariate regression analysis showed that while demand-side variables affecting the need for family support are significant, remittances are also driven by supply-side factors, particularly the migrants' income level and motivations to transfer their saving balances and invest in their countries of origin. Most significantly, it was found that once all other variables are controlled for, the passage of time itself does not have a significant effect on migrants' remittance behavior. In other words, if there is no change in the size or composition of the migrant community, there is no reason to believe that the aggregate level of remittances will fall. Provided net migration does not become negative, the size of the migrant community will not fall.

However, it is conceivable that the composition of the community will change, which makes it important to identify those compositional characteristics that most affect remittance behavior. Provided the composition of the migrant community does not move away from those who continue to maintain strong family and community ties to the home country, and who retain the belief that they will return home at some future date, there is no reason to believe that the aggregate remittance function will shift downward in such a way as to cause an otherwise increasing level of remittances to decline. As the level of income is highly significant, remittance levels can be expected to respond positively to changes in the economic environment affecting employment opportunities and income levels in the host countries, as well as to policy changes in their home country that enhance the relative attractiveness of holding financial assets there rather than in the host countries.

There is therefore more scope for positive policy intervention and coordination on the part of governments in the host and migrant-sending countries to stimulate the flow of remittances. If remittances were to decline because of a decrease in migrant stocks in OECD economies in the region, the effects would be severe. From a host-country policy perspective, these findings reinforce the view that migration and remittances ought to be considered a major form of economic assistance to Pacific Island economies, and that immigration and foreign aid policy should not be considered in isolation from each other. Policy must be addressed toward harnessing more of migrants' remittances for development investment and not toward reducing reliance on remittances by curtailing migration opportunities.

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#### APPENDIX A: HYPOTHETICAL REMITTANCE DECAY FUNCTIONS

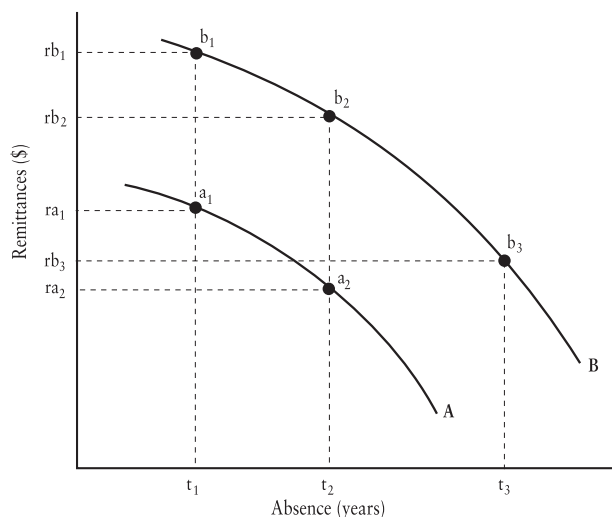


Figure A1. Hypothetical Remittance Functions with Time Decay.

Consider a situation as depicted in figure A1, where the two curves A and B represent the remittance functions of two individuals with respect to length of absence from home. Curve B is drawn higher than curve A, which implies that for any given number of years of absence, individual B will remit more than individual A. For instance, individual B could have a higher income, or individual A may have no surviving parent still living in



the home country. The curves are also downward sloping, which assumes in both instances that the level of remittances decline as the migrant's length of absence increases; eg,  $ra_2 < ra_1$ , and  $rb_3 < rb_2 < rb_1$ . From this simple example it can be seen, however, that even though  $B$ 's remittance function lies above  $A$ 's, at any given point in time it is possible that individual  $B$ 's remittances could be lower than individual  $A$ 's. For example, if individual  $B$  has been away for three years (at point  $b_3$ ) and  $A$  has been away for only one year (at point  $a_1$ ),  $A$ 's remittances ( $ra_1$ ) will be higher than  $B$ 's ( $rb_3$ ). The aggregate level of remittances in this community (of two migrants) will therefore depend on how long each person has been away, and, because both remittance functions indicate decay over time, with the passage of time the aggregate level of remittances must decline, provided of course that curves  $A$  and  $B$  don't shift their position.

## APPENDIX B: FUNCTIONAL FORM OF THE REGRESSION MODEL

The Tobit model can be specified:

$$R_i^* = \beta' X_i + u_i \quad u_i \sim N(0, \sigma^2)$$

where

$$R_i = \begin{cases} R_i^*, & \text{if } \beta' X_i + u_i > 0 \\ 0, & \text{otherwise} \end{cases}$$

letting  $R^*$  denote the dependent variable ("remittance behavior") and  $R$  the recorded value of remittances from the available data. This indicates that only when  $R^* > 0$  will  $R = R^*$ . When  $R^* \leq 0$  the observed value of remittances ( $R$ ) will be zero. The objective is then to estimate  $\beta$  and  $\sigma$  using the maximum likelihood method, where  $X_i$  is the vector of independent variables, and  $u$  is a random variable that may be interpreted as the collection of all the unobservable variables that affect  $R^*$ .

The remittance function to be estimated can then be specified as:

$$R_i^* = \beta' X_i + \varepsilon_i^*$$

where  $\beta'$  is a vector of parameter estimates,  $X_i$  is a vector of regressors and  $\varepsilon_i^*$  is the error term. For those migrants who remit,  $R^*$  is the actual

amount of remittances, while for those who do not,  $R^*$  is an index of their willingness to make remittances.

To distinguish the various categories of determinants, it is possible to specify the estimated remittance function as:

$$R_i^* = \eta_0 + \sum_{j=1}^4 \beta_{ij} D_{ij} + \sum_{k=1}^3 \gamma_{ik} S_{ik} + \sum_{p=1}^8 \alpha_{ip} M_{ip} + \sum_{q=1}^6 \delta_{iq} T_{iq} + \epsilon_i^*$$

where:  $\eta_0$  is a constant

$D_{ij}$  denotes the  $j$ th demand-side characteristic of the  $i$ th individual

$S_{ik}$  denotes the  $k$ th supply-side characteristic of the  $i$ th individual

$M_{ip}$  denotes the  $p$ th motivational characteristic of the  $i$ th individual

$T_{iq}$  denotes the  $q$ th length of absence characteristic of the  $i$ th individual

# APPENDIX C: STATISTICAL RESULTS

Appendix Table A1. Sample Means and Standard Deviations

Variable	All Migrants (Tobit estimates)				Remitting Migrants (Marginal effects)			
	Tonga		Western Sāmoa		Tonga		Western Sāmoa	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
TOTREM*	3,219.51	3,685.21	2,610.07	3,210.15	3,567.57	3,715.88	3,487.89	3,272.76
ADJREM*	3,049.53	3,603.04	2,072.15	2,568.81	3,347.17	3,643.06	2,769.06	2,624.81
SREMIT†	0.90	0.30	0.75	0.43	1.00	0.00	1.00	0.00
PARENT	0.61	0.49	0.60	0.49	0.66	0.47	0.72	0.45
SPOUSE	0.10	0.29	0.06	0.24	0.10	0.31	0.06	0.24
VISITOR	0.26	0.44	0.35	0.48	0.28	0.45	0.43	0.50
STEP	0.20	0.40	0.93	0.26	0.20	0.40	0.92	0.27
TIME‡	159.09	67.44	203.45	91.99	157.44	68.80	204.22	96.98
INCOME	35,722.70	14,827.04	31,651.01	13,744.25	35,890.85	15,298.05	32,441.70	14,216.41
ASSETS	21,986.44	55,720.61	10,838.93	50,453.37	21,100.42	54,976.37	12,991.03	56,789.92
HOUSNUM	4.10	1.81	5.06	1.76	4.07	1.78	5.16	1.79
POOR	0.24	0.43	0.39	0.49	0.24	0.43	0.41	0.49
INTENT	0.10	0.30	0.10	0.30	0.10	0.30	0.13	0.34
INHERIT	0.11	0.29	0.07	0.26	0.12	0.32	0.09	0.28

(continued)

Appendix Table A1. Sample Means and Standard Deviations (*continued*)

Variable	All Migrants (Tobit estimates)			Remitting Migrants (Marginal effects)		
	Tonga (n = 553)		Western Sāmoa (n = 298)	Tonga (n = 481)		Western Sāmoa (n = 223)
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
OWNOVS	0.29	0.45	0.07	0.26	0.30	0.08
LAND	0.57	0.50	0.11	0.31	0.58	0.13
SECONDARY	0.78	0.41	0.68	0.47	0.78	0.68
TECHNICAL	0.10	0.30	0.02	0.13	0.11	0.02
UNIV	0.03	0.18	0.03	0.17	0.03	0.04
HELPED	0.37	0.48	0.24	0.43	0.37	0.28
						0.45

\*TOTREM is all forms of remittances (A\$) and ADJREM excludes payments for airfares.

†Proportion of remitting migrants in sample.

‡In months.

Appendix Table A2. Tobit Estimates and Marginal Effects for Tongan and Western Samoan Migrants							
Variable	Tongan Migrants				Western Samoan Migrants		
	Tobit estimate	Asymptotic <i>t</i> -value	Marginal effect	Asymptotic <i>t</i> -value	Tobit estimate	Asymptotic <i>t</i> -value	Marginal effect
<i>Demand-Side Variables</i>							
PARENT	2,012.13	6.07*	602.33	10.13*	2,187.45	6.63*	269.31
SPOUSE	2,402.03	4.38*	719.04	5.29*	1,323.63	1.93†	162.96
VISITOR	916.01	2.60*	274.21	0.00	1,457.60	4.17*	179.45
STEP	1,093.57	2.54*	327.36	0.00	321.09	0.49	39.53
<i>Supply-Side Variables</i>							
INCOME\$	77.44	6.86*	23.18	18.56*	32.95	2.61*	4.06
ASSETS\$	1.86	0.63	0.56	1.24	5.99	2.01†	7.38
HOUSNUM	32.48	0.34	9.72	0.36	79.01	0.77	9.73
<i>Motivational Variables</i>							
POOR	-32.60	0.09	-9.72	0.36	343.44	0.94	42.28
INTENT	601.53	1.04	180.07	0.54	3,403.40	5.31*	419.02
SENINT	4,459.82	3.40*	-1,335.00	2.92*	-2,055.54	1.93†	-253.07
INHERIT	160.83	0.32	48.14	0.00	63.92	0.10	7.87
OWNNOVS	275.20	0.71	82.38	0.00	946.09	1.37	116.48
LAND	567.00	1.61†	169.73	0.44	-377.03	0.60	-46.42
SECONDARY	-204.48	0.36	-61.21	0.32	-400.10	1.05	-49.26
TECHNICAL	-827.12	1.13	-247.60	1.02	440.76	0.36	54.26
UNIV	-1,136.74	1.13	-340.28	0.80	1,166.82	1.20	143.65
HELPED	-43.47	0.14	-13.01	0.13	821.81	2.25†	101.18

(continued)

Appendix Table A2. Tobit Estimates and Marginal Effects for Tongan and Western Samoan Migrants (*continued*)

*Notes*

1 This is the permanent secretariat of the South Pacific Forum, an organization of the heads of government of the independent and self-governing countries of the Pacific Islands that began as the South Pacific Bureau for Economic Cooperation in 1983, and was renamed the Forum Secretariat in 1988.

2 For a good overview of the literature on migration and remittances in the third world, see Russell (1986).

3 Tongamoa (1985) surveyed 45 Tongan households in Sydney, while Faiva (1987) surveyed 150 households. There are no similar studies of Western Samoan migrants and remittances in Australia. Fuka (1985) surveyed the Tongan community in Auckland, while Loomis (1990) surveyed just over 200 households in Auckland in 1981, and 111 in 1985. None of these samples can be considered sufficiently large for reliable statistical analysis, especially when comparisons are made between subsamples that in some instances have as few as three observations (Loomis 1990, 67).

4 However, Rempel and Lobdell (1978), in their econometric analysis of urban–rural remittances in Kenya, found no significant difference in remittance levels between those who intended to return and those who did not.

5 Another econometric analysis by Straubhaar (1986) of remittance data from Turkey over the period 1963–1982 confirmed Swamy's (1981) earlier findings, suggesting a hierarchy of determinants in which the economic environment in the host country was found to be the most influential variable.

6 Strictly speaking the net change in the stock of migrants should also take into account the decrease in migrants due to natural attrition, that is, death.

7 This calculation is based on the total Tongan- and Western Samoan-born migrant populations as reported in the 1991 census (see Brown and Walker 1995, table 1.1: 4; ABS 1991). As the survey was undertaken on a per household basis, it was necessary to multiply the number of households surveyed by the average number of household members born in Tonga and Western Sāmoa—2.2 and 2.5 respectively. This implies that the survey covered 1,340 Tongan-born migrants, out of 6,168 in Australia in 1991, and 855 Western Samoan-born migrants, out of 5,742 in Australia in 1991.

8 This excludes those respondents who either did not answer this question at all or who answered "Don't know."

9 The exchange rate was approximately A\$1.00 = US\$0.72.

10 The functional form of the regression model is discussed in appendix B.

11 In a preliminary run of this model a number of other variables were interacted with TIME. These included interactions between the number of months since migration and the existence or not of a surviving parent, which, if significant, would allow for the possibility of a different rate of decay for migrants who still

have dependent parents at home; and the number of months since migration and the intention to return or not, which, if significant, would allow for the possibility of a different rate of decay for migrants who intend returning. Possible nonlinear (quadratic) relationships were also included.

12 All three are significant at the 1 percent level in both the Tongan and Western Samoan models.

13 See also Brown and Ahlburg (1997) who show, using the same data set, that permanent income is a better predictor of changes in remittance levels than transitory income.

14 The model was also estimated with the variables PARTIM, PARTIM<sup>2</sup>, INTIM, INTIM<sup>2</sup> included to test for a possible remittance decay among migrants with and without surviving parents at home, and those who intend to return or not. None of these variables was significant at the 10 percent level, individually or jointly.

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### *Abstract*

There is concern that Pacific Island economies dependent on remittances of migrants will endure foreign exchange shortages and falling living standards as remittance levels fall because of lower migration rates and the belief that migrants' willingness to remit declines over time. The empirical validity of the remittance-decay hypothesis has never been tested. From survey data on Tongan and Western Samoan migrants in Sydney, this paper estimates remittance functions using multivariate regression analysis. It is found that the remittance-decay hypothesis has no empirical validity, and migrants are motivated by factors other than altruistic family support, including asset accumulation and investment back home.

KEYWORDS: migration, regression, remittances, sample survey, Tonga, Western Sāmoa